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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA-11161 (June 2004)
NASA
Superseding NASA-11161 (December 2003)

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DIVISION 11 - EQUIPMENT

SECTION 11161

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06/04

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SECTION 11161

DOCK LEVELERS
06/04

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NOTE: Delete, revise, or add to the text in this section to cover project requirements. Notes are for designer information and will not appear in the final project specification.

This section covers mechanically operated dock levelers designed for truck actuation and well-balanced hand-operated dock levelers. Hydraulic or electro-hydraulic units and dockboards and levelers that use steel rope for chain in the mechanism by which they are positioned by the moving truck are not included.

Drawings must indicate the length and width of the dock levelers. Platform lengths normally vary from 5 to 7 feet 1525 to 2135 millimeter, with some manufacturers offering lengths as much as 10 feet 3050 millimeter and as little as 4 feet 1220 millimeter. Standard width is 6 feet 1830 millimeter, although units 6-1/2 and 7 feet 1980 and 2135 millimeter wide are available from some manufacturers.

Relatively universal 10-ton 9075 kilogram capacity is assumed in these specifications. If capacities other than this are required, the specification must be modified accordingly.

Drawings must indicate, but not detail, the pits that are to receive the levelers; also, that the pits be provided with all reinforcement, anchors, edge angles, and other built-in items recommended by the leveler manufacturer. Drainage provisions for pits must be indicated.

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PART 1 GENERAL

1.1 REFERENCES

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NOTE: The following references should not be manually edited except to add new references. References not used in the text will automatically be deleted from this section of the project

specification.
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The publications listed below form a part of this section to the extent referenced:

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC SP 10	(2000) Joint Surface Preparation, Standard Near-White Metal Blast Cleaning (NACE No. 2)

1.2 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01330, "Submittal Procedures," and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control. Include a columnar list of appropriate products and tests beneath each submittal description.
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The following shall be submitted in accordance with Section 01330, "Submittal Procedures," in sufficient detail to show full compliance with the specification:

SD-03 Product Data

Manufacturer's catalog data, including installation hardware and accessories, shall be submitted for the following items:

Truck-Actuated Levelers
Hand-Operated Dock Levelers
Spare Parts Data

SD-02 Shop Drawings

Fabrication drawings shall be submitted prior to installation for the following items and shall indicate the type and location of welds; gage, thickness and grade of steel used for each member; and type and location of all components to be installed.

Truck-Actuated Levelers
Hand-Operated Dock Levelers

Installation drawings for the following items shall include operation, construction, and installation details; and dimensions of all members and details of recess construction necessary for installation and performance.

Truck-Actuated Levelers
Hand-Operated Dock Levelers

SD-07 Certificates

Certificates shall be submitted for the following items showing

that capacities and operational requirements are as specified.

Truck-Actuated Levelers
Hand-Operated Dock Levelers

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals shall be submitted in accordance with paragraph entitled, "General Description," of this section.

1.3 GENERAL DESCRIPTION

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NOTE: If truck-actuated levelers and hand-operated counterbalanced levelers are equally acceptable, select only the first of the following three paragraphs. If both truck-actuated levelers and hand-operated counterbalanced levelers are required but not optional, select only the second of these three paragraphs; locations must be clearly differentiated on the drawings. If only one type is acceptable, select only the third of these paragraphs.
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Contractor shall submit [6] [_____] copies of the Operation and Maintenance Manuals 30 calendar days prior to testing the leveler systems. Data shall be updated and resubmitted for final approval no later than 30 calendar days prior to contract completion.

Spare Parts Data shall be provided by the Contractor indicating specified items replacement part, replacement cost, and name, address and contact for spare parts distributor.

Dock levelers may be either truck-operated or hand-operated counterbalanced units as specified.

Dock levelers shall be types shown on drawings.

Dock levelers shall be mechanical levelers.

Levelers shall be fully recessed units, securely anchored into dock recesses provided for them, and shall conform to the approved drawings.

Design shall be such that when the leveler is not in use it shall be supported in a manner to carry its rated 20,000 pounds 9070 kilogram in wheeled cross-traffic. It shall not be necessary to manually position platform supports to produce this result.

Platform shall be checkered steel to produce the maximum stiffness-to-weight ratio and provide maximum traction in use.

Dock levelers shall comply with the safety requirements of OSHA.

Access shall be provided so that lubrication may be accomplished without entry into the pit.

Water shall drain freely from all components and the unit shall be substantially weathertight when not in use.

1.4 DELIVERY, HANDLING, AND STORAGE

Materials shall be delivered to the site undamaged and shall be stored in a clean, dry area. Materials shall be handled to prevent damage.

1.5 MANUFACTURER'S WARRANTY

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NOTE: This paragraph may limit competition and provide substantial competitive advantage to bidders with service facilities in the vicinity. It must be used with caution.

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Contractor shall present a manufacturer's warranty certifying the leveler against operational malfunction or structural failure, or both, for a period of 10 years from the date of acceptance by the Government. Warranty may exclude failure through overloading evidenced by member breakage or residual deformation; but it may not exclude breakage of welds or fastenings, fatigue breakage of components, or wear of moving parts. Warranty shall cover the full costs of repairs, or replacements in case of a nonrepairable failure.

PART 2 PRODUCTS

2.1 TRUCK-ACTUATED LEVELERS

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NOTE: Delete paragraph heading and following paragraphs if truck-actuated levelers are not required. Truck-actuated levelers are not a standard item and require a special order.

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2.1.1 Construction

Dock leveler shall be built into dock pits to provide a level and stable dock floor when the leveler is not in use and so that no part of the leveler, except actuating impact members, projects beyond the leading edge of the dock when the leveler is not in use.

Construction shall reflect stresses imposed by a loaded vehicle, in motion, striking the actuating mechanism. Structural members, moving parts, and anchorages shall be designed to withstand these stresses.

Construction shall be such that when the platform has reached its design height, the remaining inertial energy of the moving vehicle will be absorbed by the face of the dock through an impact-absorbing contact pad, not by the structural or operating members of the leveler, regardless of whether the vehicle contacts the dock squarely or at an angle.

Leveler shall be provided with adjustable counterbalancing that permits the operation specified. Neither the counterbalancing system nor the operating system shall employ cables or pulleys.

Toe guards or platform skirts shall be provided to prevent insertion of objects from the sides when the leveler is in elevated position.

Vertical movement range of the platform lip shall be not less than 12 inches 300 millimeter above and 8 inches 200 millimeter below dock level. Design shall be such that with trucks with beds as much as 12 inches 300 millimeter higher than the truck dock will not interfere with the extension of the lip or the normal operating cycle of the leveler.

A platform lip at least 12 inches 300 millimeter wide shall be provided.

Rollover and cross-traffic load capacity of the leveler shall be 20,000 pounds 9070 kilogram; design safety factor shall be 3 to 1 based on ultimate strength; design load factor without residual deflection of any member shall be 1-1/2 to 1. Capacities shall be assessed with the lip resting on the truck bed.

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NOTE: The first of the two paragraphs that follow permits the use of the manufacturer's standard finish as an economy. The second is more expensive, but particularly serviceable in high-corrosion areas.

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Dock leveler shall be protected by the manufacturer's standard coating system.

Ferrous surfaces of the entire leveler assembly shall be abrasive blasted to near white metal as defined in SSPC SP 10 and coated with an inorganic-zinc coating in accordance with the manufacturer's instructions.

Sliding surfaces, bearings, and pivots shall be fully protected during painting.

2.1.2 Operation

Power for leveler actuation shall be provided by a truck or trailer backing into the dock at leveler location. Actuation shall be positive if 70 percent of the bed lines up with the leveler; actuation shall be effective over an angular range of 15 degrees in either direction from a perpendicular approach.

A truck or trailer backing up shall actuate the leveler when it strikes the impact members of the leveler actuation mechanism. Platform shall rise to its maximum height as the vehicle moves toward the final dock position. When the impact members have made full contact with the face of the dock, the platform, with lip extended, shall descend until the lip is resting firmly on the vehicle bed. Descent either shall be automatic or shall require not more than 100 pounds 45 kilogram applied downward at front edge of platform. Before the platform begins its descent, toe guards or platform skirts shall be in position to prevent foot injury to personnel.

Should there be a load of 150 pounds 68 kilogram or more on the platform, it shall remain flush with the dock floor. Design shall preclude damage to the platform or lip, even though the vehicle is in not more than 70 percent lateral alignment with leveler or is approaching the dock at an angle deviating as much as 15 degrees from perpendicular.

When the loading or unloading operation has been completed and the vehicle leaves its position at dock, the platform shall return to the level of the dock floor where it shall remain as part of the dock floor until next use. If the lip is hinged, it shall revert to a vertical position flush with the

face of the dock. Impact members of the actuating system shall return to their preactuating position, ready for next use. Return of the platform to dock level from a position above dock level either shall be automatic or shall require a pressure of less than 100 pounds 45 kilogram at the front edge of the platform. Return of the platform from a position below dock level shall be automatic. When the platform has returned to dock level it shall be automatically locked. In this position, the platform shall be automatically supported to consistently withstand rolling cross-traffic loads of up to 10 tons 9070 kilogram.

2.2 COUNTERBALANCED, HAND-OPERATED DOCK LEVELERS

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NOTE: If counterbalanced, hand-operated levelers are not required for the project, delete paragraph heading and all of the paragraphs under it.
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2.2.1 Construction

Dock leveler shall be built into dock pits to provide a level and stable dock floor when the leveler is not in use. No part of leveler shall project beyond the leading edge of the dock.

Construction shall reflect stresses imposed by its role as both a part of the dock floor and as the ramp over which heavy loads are transferred between vehicles and the dock. Construction shall also keep moving parts simple and rugged to ensure a minimum of adjustment, servicing, and repair. Operating mechanism shall employ no pulleys, cables, or chains other than possibly a lift chain by which operation is manually initiated.

Leveler shall be designed for rolling loads of not less than 10 tons 9070 kilogram in operating position and 15 tons 13,610 kilogramwhen serving as part of the dock floor. Safety factor shall be 1-1/2 to 1 without residual deformation and 2 to 1 without structural failure.

Counterbalancing shall be such that when adjusted to automatically settle into operating position from raised position, the force required to initiate operation shall not exceed 50 pounds 23 kilogram in hand lift, or 100 pounds 45 kilogram on foot pedal.

If design is such that a foot pedal is employed to initiate operation, with the platform slowly elevated to maximum height by the counterbalancing system from where it is lowered to vehicle bed level, the force required to lower the platform shall not exceed 100 pounds 45 kilogram applied within 1 foot 300 millimeter of the end of the platform.

Toe guards or platform skirts shall be provided to prevent injury to dock personnel.

Range of vertical movement of the platform lip shall be not less than 16 inches 405 millimeter above and 12 inches 300 millimeterbelow dock level.

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NOTE: The first of the two paragraphs that follow permits the use of the manufacturer's standard finish as an economy. The second is more expensive but particularly serviceable in high-corrosion areas.
****

Dock leveler shall be protected by the manufacturer's standard coating system.

Ferrous surfaces of the entire leveler assembly shall be abrasive blasted to near white metal as defined in SSPC SP 10 and coated with inorganic-zinc coating in accordance with the manufacturer's instructions.

Sliding surfaces, bearings, and pivots shall be protected during painting.

2.2.2 Operation

Initiation of operation shall be by pull ring in the platform or by a foot pedal located in a nonmoving member at dock level but out of dock traffic areas.

When the platform has reached its maximum height above dock level and lowering toward vehicle bed level begins, the platform lip shall automatically extend. Whether lowering is by counterbalance or an applied downward force, it shall continue until the lip firmly engages the vehicle bed; it shall remain so engaged until cargo transfer has been completed and the vehicle moves free of the platform lip, at which time the platform shall return to dock level. Return from a level below dock level shall be automatic. Platform either shall lock at dock level with the lip flush with the dock face or shall rise to 1 or 2 inches 25 or 50 millimeter above dock level where a pressure of not more than 100 pounds 45 kilogram applied within 1 foot 300 millimeter of the front edge of the platform will lower it into locked, dock-level position. If the return to dock level is from a position above dock level, the return to locked position at dock level either shall be automatic or shall occur upon application of a downward force of not more than 100 pounds 45 kilogram applied to the platform within 1 foot 300 millimeter of the front edge.

Dock leveler shall be provided with a safety that automatically supports the ramp if a vehicle pulls out while the ramp is carrying a load.

Design shall include automatic tilt adjustment to accommodate a minimum of 15 degree misalignment of dock and truck bed.

Design shall provide for slow changes in slope of ramp in response to changes in truck bed height during loading and unloading operations. This shall not permit the fall of a loaded ramp if truck pulls out.

Under no circumstances shall it be possible for the lip, when not serving a vehicle, to be in a position where it could damage a vehicle backing into position at the dock.

PART 3 EXECUTION

3.1 INSTALLATION

Installation shall be in accordance with the manufacturer's recommendations and approved drawings.

3.2 TEST

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NOTE: Delete first paragraph if truck-actuated levelers are not required.

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Contractor shall conduct a test to demonstrate the operation of the leveler. In this test, a truck shall be backed into unloading position at the leveler at an approximate speed of 3 feet per second (about 2 miles per hour) 1 meter per second (about 3 kilometer per hour) and for not less than 30 times. Test shall include 10 approaches in misalignment at least 30 percent of the platform width; tests shall also include at least 15 degrees from perpendicular in each direction. Should there be any failure of the leveler to operate as specified, necessary corrections shall be made and entire test series shall be repeated. This shall continue until a complete series of successful tests has been completed. Should there be a failure of any component, or residual deformation of any member, replacements shall be made and the series shall be repeated.

Before acceptance of the leveler by the Government, the Contractor shall conduct two load-bearing tests as follows:

With the platform in normal position flush with the dock floor, a 15-ton 13,610 kilogram rolling load shall be imposed upon the platform. There shall be no residual deformation of any member.

With the lip of the platform resting upon a structural support to simulate its position on a truck bed, the platform shall be subjected to a rolling load of 10 tons 9070 kilogram for a period of 30 minutes. There shall be no failure or residual deflection of any component.

-- End of Section --